III.—BATEMAN: DARWINISM TESTED BY LANGUAGE.

Darwinism Tested by Language. By Frederic Bateman, M. D. etc. London, 1877.

(*Conclusion.*)*

In order to establish the fact that the possession of articulate language constitutes a difference between man and the lower animals, not only of degree but of kind, Dr. Bateman enunciates three propositions:

"I. That articulate speech is a *distinctive* attribute of man, and that the ape and lower animals do not possess a trace of it.

"II. That articulate speech is a *universal* attribute of man—that all races have a language, or the capacity of acquiring it.

"III. The immateriality of the faculty of speech."

Taking up these propositions *seriatim*, we proceed to inquire, in the first place, whether or not it is quite certain that the lower animals are not possessed of the faculty of expressing their thoughts and emotions by articulate speech.

We must, in the beginning, divest ourselves of the idea that, because we are incapable of appreciating the various modulations and inflections of the sounds uttered by the lower animals, therefore such modulations and inflections do not exist. Those sounds have been studied to a very slight extent, and we all know how difficult, if not impossible, it is for us, if unacquainted with a language, to detect differences in the articulations uttered. All the words seem to run into each other, to form an incomprehensible lot of gibberish. It is only after long study and familiarity that we are enabled to pick out the words, and to give them their linguistic value.

That the lower animals are able to communicate ideas to each other by sounds emitted from the larynx, appears to be very certainly established. We see instances every day among the animals that man has domesticated. The cock calling his hens, the hen informing her brood that she has found something good to eat, the recognition of his companion in the sounds uttered by the horse, are all instances in point.

Leroy,† than whom few have investigated the mental faculties of the lower animals with more thoroughness, thus speaks of the subject of their utterance of articulate sounds:

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*See this journal, for April, 1878.

†The Intelligence and Perfectibility of Animals, from a Philosophic Point of View. London, 1870, p. 72. Charles Georges Leroy, born in 1723, succeeded his father as Ranger of Versailles and Marly. In this post he enjoyed ample opportunities for the observation of animals. His letters on the subject were written over the signature of "The Naturalist of Nuremburg."

"Do they speak or not? This question must be resolved by the solution of two others. Have they the necessary conditions of speech? Could they, without it, do what they do? The only requirements of language are connected ideas and the faculty of articulation. We have proved, and that without the shadow of a doubt in the preceding letters, that animals feel, compare, judge, reflect, etc. They have, then, in respect of connected ideas, all that is required for speech. As for the faculty of articulation, most of them have nothing in their organization which, so far as we can judge, forbids it. Birds, in other ways so widely differing from ourselves, succeed in forming articulate sounds precisely the same as ours. Animals have, then, all the necessary conditions of language. But if we closely investigate their actions in detail, we perceive further, that we cannot, for an instant, deny them the power of communicating some, at least, of their ideas to one another; and this by the aid of words. We are positive that they never fail to distinguish between the cry of terror and that which expresses love. Their different agitations have different intonations which characterize them. If the mother, alarmed for the safety of her family, had but one cry to warn it of its varying dangers, the family would always be sure to do the same thing when uttering the cry. But, on the contrary, their movements vary according to circumstances. Sometimes a hasty flight is the consequence of the cry of alarm; at others, concealment; and at another time they advance to the combat. Since, then, the actions which follow the mother's command are different, it is impossible to conceive that her language is uniform. Can we assert that the expressions of a male and female during the period of their intercourse are not very various, when we can clearly perceive in them a thousand movements all differing one from another—eagerness more or less pronounced on the part of the male; reserve, mingled with allurement, on the part of the female; pretended denials, rage, jealousy, quarrels and reconciliations? Can we imagine that the sounds accompanying these emotions do not correspond with the situations they express? It is true that the language of signs is in great use among animals, and that it suffices for the communication of most of their emotions. This language, familiar to all who feel more than they think, makes an immediate impression, and its communication of feeling is almost instantaneous; but it is not enough to express all those combined actions of animals which suppose concert, agreement, designation of place, etc. Two wolves, who, to facilitate their chase, have each taken a different part—that of the one being to attack the victim, while the other awaits it at some place agreed upon, to run it down with fresh strength—cannot have acted thus admirably in concert without some mutual communication, and this communication is inconceivable unless they have a spoken language.

"The education of animals is mainly conducted by means of the language of action. Example shows them most of the movements necessary to the preservation of their natural life. But in cases where the objects of foresight and of fear increase with the increase of danger, this language becomes inadequate; instruction becomes more complicated, and words are necessary to convey it. Without spoken language the education of a fox could not be completed. It is a notorious fact that, long before they have had any chance of learning, by personal experience, young foxes leaving the den for the first time are more suspicious and watchful in places where they are much hunted, than are the old ones in more peaceful neighborhoods. This truth, which is incontestable, demonstrates, once for all, their need of language; for how, in its absence, could they acquire this science of precautions, which supposes in them a number of facts, and the power of comparing and of appreciating them? It seems, then, absurd to doubt that animals have a language, by means of which they transmit to one another those ideas the communication of which is necessary."

Houzeau* does not hesitate to ascribe, at least to birds, the faculty of forming articulate sounds for the purpose of conveying ideas, using for this purpose powers corresponding to our vowels and consonants, and hence enabling us to pronounce and write them. The cries of the whip-poor-will and the cuckoo are familiar to all, but there are many other notable instances to be met with, especially in tropical regions. Waterton speaks of a night-bird in Guiana, whose cry was distinctly, "Who are you? Who, who are you?" And of another that, in a tone of command and of anger, clearly said, "Work away! work away! work away!" And of a third that, in sorrowful accents, uttered the words, "Willy, come go! Willy, Willy, Willy, come go!"

Of course it will be understood that it is not alleged that the birds were uttering the words cited with any knowledge that they belonged to the English language, or were associated with any such ideas as they represent to our minds. The instances are only given as illustrations of the ability of these animals, even when not taught, as are the parrot and the raven, to enunciate articulate sounds which can be represented by our letters.

Attempts have been made, and with success, to represent in written words the sounds made by the lower animals, which have no similarity to any human language. Bechstein† has done this with the nightingale, and has ascertained that this bird, in the course of an hour or two, enunciates over forty distinct sounds, which are representable by letters of our alphabet. Can we be bold enough to declare that these are meaningless, and that they are not understood by other nightingales? These forty primitive sounds are enough to form a language as complicated as our own, and infinitely more so than that of the degraded human beings whose vocabulary is so imperfect that, in the dark, when deprived of the assistance of gestures, they cannot comprehend each other.

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* Études sur les facultes mentalés des animaux comparées a celles de l'homme. Mons, 1872, t. II., p. 323.

† Naturgeschichte der Hof und Stubenvogel. Art. "Nachtigall."

In attempting to represent the entire song of the nightingale, Bechstein writes it as follows, the letters having the powers given to them in the German language :

"Tiou, tiou, tiou, tiou—Spe, tiou, squa—Tio, tio, tio, tio, tio, tio, tio, tio, tix—Coutio, coutio, coutio, coutio—Squo, squo, squo, squo—Tzu, tzu, tzu, tzu, tzu, tzu, tzu, tzu, tzu, tzi—Corror, tiore, squa, pipiqui—Zozozozozozozozozozozozozirhading—Tsississi, tsisississississis—Dzorre, dzorre, dzorre, dzorre hi—Tzater, tzater, tzater, tzater, tzater, tzater, tzater, dzi—Dlo, dlo, dlo, dlo, dlo, dlo, dlo, dlo, dlo—Quio, trrrrrrrrr itz—Lu, lu, lu, lu, lu, ly, ly, ly, ly, lie, lie, lie, lie—Quio, dide, li, lulylie—Hagur, gurr, quipie, coui, coui, coui, qui, qui, qui, qui, qui, qui, qui—Goll, goll, goll, goll, guia, hadadoi—Conigui, horr, ha, diadia, dill si !—Hezezezezezezezezezezezezezezezeze, cowar ho dze hoi—Quia, quia, quia, quia, quia, quia, quia, ti—Ki, ki, ki, ki, io, io, io, ioioioio, ki—Lu, li, li, le, lia, la, len, lo, dide, io, quia—Kigaigaigaigaigaigai, guiagaigaigai conior, dzio, dzio, dzio pi."

In his remarks on the subject of the vocalization of which birds are capable Houzeau says :

"The language of birds contains a notable part of the letters of the alphabet, and even the double consonants are employed, such as *dz* and *dl.* There are also simple vowels and diphthongs. The greater part of the consonants used are combined with vowels as initial letters of syllables. The use of consonants after vowels, as final letters is much more rare, the letters *l*, *n*, and *r* being the only ones which figure in this situation. But from the lack of various letters, and of combinations or syllables we are not to conclude that there is a total absence of articulate sounds. We, ourselves, do not make use of all possible combinations of final consonants after a vowel. Many nations do not even use all the letters, and cannot even pronounce those which do not enter into the composition of their alphabets. Several African languages do not contain *r.* The Chinese not only do not have this rolling consonant, but they lack also other simple consonants, as *b*, *d*, *v*, *z.* They pronounce Holland *Golanki*, and France *Fulanteus.* The Polynesians do not have the sibilant *s.* They do not place consonants after vowels in the same syllable, so that all their words end in vowels. The Hurons have none of the labials (*b*, *f*, *m*, *n*, *p*, *v*,), and the vowel *u*, which is articulated by the lips, is also wanting. Garcilasso says that the Peruvians not only do not have the letters *b*, *d*, *f*, *g*, *s*, *x*, but that they do not even form a single double consonant. The Feejeans do not possess the *c*, the Somo Somos the *k*, or the inhabitants of Rakiraki the *t.* The Australians have no *s.* The Indians of French Port, in British Columbia, lack the letters *b*, *d*, *f*, *j*, *p*, *v*, *x.* But the poorest of all people in articulate sounds are those of New Zealand, whose alphabet does not contain the twelve following letters: *b*, *c*, *d*, *f*, *g*, *j*, *l*, *q*, *s*, *v*, *y*, *z*, and the double letter *x*."

In view of these facts, and of many others of fully as striking a character, which could readily be cited from other parts of the animal kingdom, it is certainly going too far to deny to all the beings lower in the scale of creation than man, the faculty of articulate speech. We are forced, therefore, to regard Dr. Bateman's first proposition as unproven, and, hence, as of no weight in the determination of the matter at issue. This is the least that can be said, the probability being, that so far as we can judge from an attentive study of the habits, and the actions of, and the sounds emitted by many of the lower animals, they are possessed of an articulate language by which they are enabled to communicate with others of their kind.

But we may go further and enter what in law would be called a demurrer. Suppose his proposition to be true, and that man is really the only animal possessing the faculty to articulate speech ; what then? Would it then be a difference in kind such as Darwin demanded ? We cannot see that it would. Articulate language is only a refined and exalted way of expressing ideas, and when we are by accident or disease deprived of the power of speech we have recourse to other methods for making ourselves understood, which by constant practice answer all our purposes. The signs, and gestures, and facial expressions of the ape, dog and other animals serve for all their purposes of communication with man, and are fully as unerring in character as any that human beings employ. They use a language which is in direct accordance with the ideas they wish to express, and the mere fact that it is not articulated by the tongue and lips is a non-essential point in the discussion.

But it may be asked, why does not the ape speak our language? For all we know to the contrary the chattering which these animals keep up when in their native forests, at the approach of man, may consist, to some extent, of like questions as to his inability to converse with them in their tongue—still we may very properly answer the question by replying that no patient and persistent attempt, so far as we know, has ever been made to teach him. Besides, it would be well, it appears to us, in case any such course of instruction is contemplated, not to begin with so difficult a language as English—one which even educated Chinese can never learn with tolerable thoroughness—but with some of the languages lower in the scale, such as those spoken by the human beings living in close proximity with this advanced animal. We are very strongly of the opinion that if such an attempt were made, not on a single ape, but on a group—a class it might be called—and carried out with some such degree of persistence as is employed with very imbecile children, an astonishing success would attend the effort.

And in this connection we may call attention to the fact quite recently demonstrated by Dr. Spitzka, since the first part of this review was published, that the brain of the chimpanzee has an island of Reil not devoid of convolutions as asserted by Huxley and others, and hence not differing in kind from the same organ in man. As Dr. Spitzka's observations have not yet been published, the following synopsis of them which he has been kind enough to send us will doubtless prove of interest:

"In a young chimpanzee about two years old this region [the island of Reil] is as completely covered by the enveloping operculum and temporal lobes as in man; it is equally with the human, triangular in shape, and the acute apex of the triangle is directed backwards as in man. It had four distinct gyri, and the most posterior of these showed bifurcation at its upper end. In a large chimpanzee whose convolutions were much more intricate than those of the younger animal there were five such gyri, an inferior frontal convolution was present and well developed.

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I should add that proportionally to the size of the entire hemisphere, the island of Reil is as large as in man."

The ape, therefore, in all probability, does not speak our language first, because he has never been taught to do so, and, second, because the island of Reil and brain generally are not sufficiently developed to enable him to initiate through his own unaided efforts the various intellections and functionations necessary to the articulation of human speech. In this last respect he does not differ essentially from those children in whom from arrest of cerebral development the faculty of articulate language is never acquired. We doubt very much whether children of any nation, if allowed to grow up without association with other persons speaking a language, would in a single generation be any better off as regards articulate speech than many of the lower animals.

Dr. Bateman quotes a very interesting autograph letter to him from Prof. Vogt, as follows:

"The brain of man and that of apes, especially of the anthropoid apes (orang, chimpanzee, gorilla) are constructed absolutely upon the same type—a type by itself, and which is characterized amongst other things, by the fissure of Sylvius and by the manner in which the island of Reil is formed and covered. Thus in man, the third frontal convolution is extraordinarily developed and covers partly the inside, whilst the transverse central convolutions are of much less importance. In the ape, on the other hand, the third frontal convolution is but slightly developed, whilst the central transverse convolutions are very large.

"To show the bearing which all this has upon the seat of speech I would refer to the microcephali who do not speak; they learn to repeat certain words like parrots, but they have no articulate language. Now the microcephali have the same conformation of the third frontal convolution as apes. They are apes as far as the anterior portion of their brain is concerned. Thus man speaks; apes and microcephali do not speak. Certain observations have been recorded which seem to place language in the part which is developed in man and contracted in the microcephali and in the ape. Comparative anatomy, therefore, comes in aid of M. Broca's doctrine."

The microcephali do not, as Prof. Vogt asserts, or as Dr. Bateman admits, speak, but they are none the less men, nor are apes any the less microcephali because they do not talk.

The second proposition of Dr. Bateman has no special bearing upon the subject under discussion. We may admit with him that there is no people, nation or tribe that does not possess some form of articulate language, imperfect as some of them are.

As regards the third proposition relative to the immateriality of the faculty of speech, we must confess to our inability to comprehend exactly what Dr. Bateman means. He says he is tempted to ask, "whether speech, like the soul, may not be an attribute, an immaterial *nescio quid*, the comprehension of which is beyond the limits of our finite minds?" To which we might answer by another question, "Of what is the soul an attribute?" and, by another, that "If the matter is beyond comprehension, why attempt to discuss it?"

But Dr. Bateman, under this proposition, adduces certain examples and arguments which, as he thinks, militate against the doctrine of the localization of the faculty of speech in the part of the brain assigned to it by Broca—the posterior part of the left third frontal convolution. In this he is, we think, creating a theory for the purpose of demolishing it, for very few, if any cerebral physiologists now contend for the limited localization of Broca. To this point we have already in the first part of this review invited the attention of the reader. We have there asserted that there is not a single instance on record of the "speech tract" being the seat of disease without there being at the same time impairment or loss of the faculty of articulate speech. It will however, probably not be out of place, to refer more at length to some of the cases cited by Dr. Bateman, and to point out the fallacy of his argument from them.

He says (page 181): "I have shown, and that upon the most indisputable authority, that persons could talk when the presumed seat of speech was invaded by an enormous tumor, completely disorganized by disease or destroyed by a pistol-shot."

The case of the tumor is the one reported by Velpeau, and to which all writers on aphasia make reference. "In the month of March, 1843, a barber, sixty years of age, came under M. Velpeau's care for disease of the prostate gland. With the exception of his prostatic disorder, he seemed to be in excellent health, was very lively, cheerful, full of repartee, and evidently in possession of all his faculties; one remarkable symptom in his case was his intolerable *loquacity; a greater chatterer* never existed, and on more than one occasion complaints were made by the other patients of this talkative neighbor who allowed them rest neither night nor day. A few days after admission this man died suddenly, and a careful autopsy was made. On opening the cranium, a cancerous tumor was found which had taken the place of the two anterior lobes." Now in regard to this case we have observed in another place,* "very little faith seems to have been put by physiologists or pathologists in the history of this case. If it proves anything, it is that the anterior lobes are useless appendages to the rest of the cerebral system." And we find that Kussmaul † says of it: "In order to draw out Bouillaud, Velpeau demanded the prize of 500 francs for a case in which a lobulated cancer had professedly destroyed the two anterior lobes; in truth, however, it had left untouched the greater part of them and especially two-thirds of the left frontal lobe."

Even admitting all that was claimed for this case by Velpeau, it does not in the least weigh against the theory of the localization of the faculty of speech in those parts of the brain to which we have already ascribed its situation—those which are nourished by the middle cerebral artery.

The case in which, according to Dr. Bateman, the presumed seat of speech "was completely disorganized by disease," is the one reported by M. Peter. In this instance the skull of a man was fractured by a fall from a horse; after recovery there succeeded "a *remarkable loquacity*, although after death it was found that the two frontal lobes of the brain were reduced to a pulp." Now in this case the man was in a state of furious delirium during the whole period of his life (thirty-six hours) after the reception of his injury, and in addition to the disorganization of the anterior lobes there was a fracture of the roof and base of the skull throughout its entire extent. The case simply militates against Bouillaud's theory, and not against the one now held by the majority of neurologists; and Trousseau claims no more for it than as proving that the two frontal lobes may be destroyed in their anterior portion without causing a loss of the faculty of speech.

In the case in which the "*presumed* seat of speech" was destroyed by a pistol-shot, we find that two officers fought a duel; one of them fired first and the ball entered his adversary's head at one temple, passed through the brain and then raised the temporal bone on the opposite side. The ball was extracted, and the patient immediately made a sign with his hands and expressed his thanks in a very low voice. He recovered for the time being, and during five months thereafter could speak perfectly well, and was remarkable for the wit and fluency of his conversation and writing. He subsequently died of softening, and it was found on post-mortem examination that the ball had passed through the two frontal lobes in their middle portion.

This case is open to all the objections alleged against the other two, and so also is the one reported by M. Moreau (de Tours) in which the third frontal convolution was congenitally absent.

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* A Treatise on Diseases of the Nervous System. Sixth edition, New York, 1876, p. 173.

† Op. Cit. (American translation.)

Now, Dr. Bateman admits that if M. Broca's theory could be shown to be correct, Darwin's views would receive confirmation. Of course this admission is equally good for any other localization of the faculty of speech. We have seen that there is a "speech tract," that this region embraces the posterior part of the anterior lobe, the anterior part of the middle lobe, and the lobe of the insula, or island of Reil—those parts, in fact, which are nourished by the middle cerebral artery. It exists on both sides of the brain, though more developed on the left than on the right side; and we repeat that there is no instance on record in which injury or disease involved the whole of this region on both sides which was unaccompanied by derangement of the faculty of articulate language. In very many cases comparatively slight lesions of this region on either side, especially the left, have been sufficient to cause such derangement.

In view of these facts—and they are but a small part of what could be brought forward—we are forced to the conclusion that Dr. Bateman has failed altogether to make out his case. Darwinism, as he calls it, may or may not be true, but it is not to be overturned by such assaults as his. Nevertheless he has written an interesting essay, and one which will, doubtless, add to his reputation as a perspicuous and thorough thinker; and we commend his little book both to evolutionists and anti-evolutionists. The former will not fail to see how weak are the arguments of their adversaries, the latter will probably get a few grains of comfort; and, at any rate, will be made acquainted with some of the scientific aspects of a most important subject.

W. A. H.